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THESIS

A CASE STUDY OF THE MATERIALS MANAGEMENT DEPARTMENT AT THE NAVAL MEDICAL CENTER SAN DIEGO BENCHMARKING EFFORT

by

Pia S. Boston

March, 1997

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REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

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1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE March 1997	3. REPORT TYPE AND DATES COVERED Master's Thesis

4. TITLE AND SUBTITLE A CASE STUDY OF THE MATERIALS MANAGEMENT DEPARTMENT AT THE NAVAL MEDICAL CENTER SAN DIEGO BENCHMARKING EFFORT	5. FUNDING NUMBERS
6. AUTHOR(S) Pia S. Boston	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey CA 93943-5000	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.	12b. DISTRIBUTION CODE

13. ABSTRACT *(maximum 200 words)*

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14. SUBJECT TERMS: Benchmarking, Materials Management, Case Study	15. NUMBER OF PAGES 80
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std 239-18 298-102

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of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
March 1997

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ABSTRACT

This thesis sought to provide lessons learned, recommendations and provoke thought among medical logisticians on the use of benchmarking. The researcher used a single case research strategy to assess how successful the Materials Management Department at the Naval Medical Center San Diego has been in implementing benchmarking as suggested by strategic objective 2.5.43 of the 1994 draft of the Navy Medical Logistics Strategic Plan. Information on the implementation of benchmarking in the Materials Management Department was based upon a questionnaire, document reviews and direct observation. The research included reading and reviewing the current literature on benchmarking to compare private sector thinking with current practices in the Materials Management Department. The benchmarking case used the Ten-Step Department of the Navy Benchmarking Model. The analysis and conclusions are based upon the initial research questions propositions and the framework of the critical success factors for a benchmarking study. The results of the case suggest a cost-benefit analysis was done to purchase sterilization equipment.

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ACKNOWLEDGMENTS

To my parents and siblings, thank you for your continued support and confidence as I pursued a Masters of Science in Materials Logistics. My next educational journey is earning a Ph.D. in the next millennium.

To my dearest friend, Anthony R. Woodley, thank you for your love and support. I know it was tough at times for you to stay away while I worked on my thesis but you managed it with faith and courage.

Finally, a warm thank you is due to Daisy Ware (Grandmother), Sara Bellamy-Walker (Cousin), Bridget Taylor, Alex Michael, and Antionette(Walker) Bell without the knowledge of each of you my life would have been a little tougher. Thank you and Thank God.

I. INTRODUCTION

This chapter explains the objective of the thesis, presents the research questions, describes the scope, limitations, and assumptions of the research effort, and delineates the organization of the study.

A. BACKGROUND

In 1994 the leaders in the medical logistics community drafted the Navy Medical Logistics Strategic Plan. The initial plan consisted of five goals, several strategies, and an ambitious number of objectives. Strategic objective 2.5.43 suggested benchmarking with other organizations to learn about industry's best practices.

Medical logistics leaders have had a history of establishing progressive goals and strategies. Yet, simply establishing goals and strategies is not enough; implementation, monitoring, and ongoing review need to occur. This thesis will describe how each of these elements transpired in one activity, the Materials Management Department (MMD) of Naval Medical Center (NMC) San Diego, which has completed a benchmarking effort.

Since the introduction of that draft, the final version of the Navy Medical Logistics Strategic Plan has been published. Although, the logistics chiefs did not include strategic objective 2.5.43 in the final plan, benchmarking is still a useful tool to facilitate organizational change. When an organization decides to benchmark, they are seeking a competitive edge, world-class status, and seeking to become a leader in customer satisfaction.

B. OBJECTIVE OF THESIS

This thesis provides lessons learned and recommendations, and it provokes thought among medical

logisticians on the use of benchmarking. The author used a single-case method to assess how successful the Materials Management Department at the Naval Medical Center San Diego was at implementing benchmarking as suggested by strategic objective 2.5.43 of the 1994 draft of the Navy Medical Logistics Strategic Plan. Research concentrated on assessing individuals' knowledge and perception of the benchmarking effort, their assessment of its value and identifying potential barriers and lessons learned.

C. RESEARCH QUESTIONS

The following research questions are addressed in this thesis:

1. Primary Question

How successful has the Materials Management Department at Naval Medical Center San Diego been in implementing benchmarking as required by strategic objective 2.5.43 of the 1994 draft of the Navy Medical Logistics Strategic Plan?

2. Secondary Questions

What is benchmarking and what are the critical elements for benchmarking success?

How is the Materials Management Department implementing benchmarking?

How does the Materials Management Department experience compare to private sector thought regarding benchmarking?

What are the "lessons learned" from the Materials Management Department experience that may have broader medical logistics community applicability?

D. SCOPE AND LIMITATIONS

The scope of this thesis is a case study that consists of three parts: 1) a description of a case, 2) an analytic generalization of the data, and 3) lessons learned from the research. The research was conducted for more than six

months and included reading and the reviewing current literature on benchmarking. Information on the implementation of benchmarking in the Materials Management Department is based upon one questionnaire, document reviews and direct observation of the results of the study. This study is limited to one division in one organization. One should be cautious in generalizing the results to other divisions or organizations within Navy Medicine because many of the original study participants were not questioned. Almost all had either changed duty stations or had retired. This resulted in interviews with individuals indirectly related to the benchmarking effort. In addition, little written historical documentation was available about the benchmarking study. These factors directly affected the level of detail in the case and the depth of the analysis.

E. ORGANIZATION OF THE THESIS

This case study assumes that the reader has little knowledge of benchmarking. If the reader is already familiar with benchmarking it may be useful to read this section, then proceed to areas of interest.

Chapter I explains the objective of this thesis, presents the research questions, describes the scope and limitations, and delineates the organization of the study.

Chapter II introduces the research strategy and methods.

Chapter III discusses private sector thought regarding benchmarking.

Chapter IV is a description of the study in the framework of the critical success factors and the Ten-Step Department of the Navy Benchmarking Model.

Chapter V analyzes the findings from the implementation of benchmarking in the Materials Management Department. The

analysis focuses on comparing the case study with private sector thought. It also identifies areas of future research.

II. RESEARCH METHODS

A. OBJECTIVE OF THE RESEARCH

This research will focus on the implementation of benchmarking in one organization, the Materials Management Department at the Naval Medical Center San Diego. Strategic objective 2.5.43 of the 1994 draft Navy Medical Logistics Strategic Plan suggested benchmarking with other organizations. Although logistics chiefs did not include this objective in the final strategic plan, benchmarking is still a useful tool to facilitate change in an organization and promote continuous process improvement. This thesis assesses one department's success in carrying out benchmarking. Finally, this thesis provides lessons learned and recommendations, and it aims to provoke thought among medical logisticians on the use of benchmarking.

B. RESEARCH METHOD

This thesis is based on a single case study. Robert Yin (1989) defines a case study as, "An empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used." (p. 23) Case study research is appropriate when the research demands: an assessment of current events that were not influenced by the researcher; a variety of data sources are available; and answers to specific theoretical propositions are essential (Yin, 1989).

The use of the case study strategy is appropriate for this research for three reasons. The first criterion requires the assessment of a current event. The evaluation of the benchmarking study performed by the Materials Management Department at NMC San Diego constitutes the

assessment of a current event. Because people and documents are readily available to support the empirical research the second criterion is met. Finally, the third criterion requires answers to specific research questions. The answers to the research questions are gained by way of the research process by that telling what the researcher is studying.

1. Data Gathering

Yin (1989) says, "Evidence for case studies may come from six sources of data: documentation, archival records, interviews, direct observation, participant-observation, and physical artifacts." (p. 85) For this research, literature reviews, interviews, reviews of documents, and a site observation were data sources for the case study.

a. Literature Review

A literature review was conducted to determine the commonly held themes regarding benchmarking and to identify: (1) a benchmarking model to use to describe and analyze the MMD experience, and (2) critical success factors necessary for an organization to address when attempting a benchmarking study. Over 32 pieces of literature pertaining to benchmarking were reviewed. Several books and periodicals were obtained by conducting a keyword search of the Naval Postgraduate School's BOSUN, a computerized card catalog. Additionally, the researcher consulted PROQUEST, an electronic journal database to locate articles on benchmarking. The researcher also made use of additional reference material available through the state of California inter-library loan service.

b. Site Visit

Due to time and monetary constraints only one site visit was conducted. Early discussions with the head of the Materials Management Department and Total Quality Leadership

Director at the Naval Medical Center San Diego deemed structured interviews would be the most effective method of data gathering. During the three day site visit, structured interviews, observations, and document reviews were conducted.

c. Interviews

Yin asserts, "[Interviews] can provide shortcuts to the prior history of the situation, so that the investigator can readily identify other relevant sources of evidence." (p. 91) The researcher used the results of the literature review on benchmarking to develop a list of 35 questions. Interviewee demographics such as: grade or rank, gender, title, and position held in the department were collected. The remaining questions focused on the individual's understanding of how MMD conducted its benchmarking study. Particular emphasis was placed on gaining information about why the benchmarking study was conducted, study participants, how the department planned the study, how the study was actually conducted, levels of leadership support provided, use of outside assistance, training conducted, lessons learned, rewards and incentives given, and finally publicizing of study results. The appendix contains the interview form and exact questions used.

Initially, interviewees were selected based upon their direct involvement in the benchmarking study. At the time of the interview a confounding factor emerged: many of the original study participants either had changed duty stations or had retired. This forced the researcher to relax the criteria of direct involvement in the benchmarking study to permit interviews with individuals who were

indirectly related to the benchmarking effort. This resulted in seven people being interviewed. They included:

- The department head who sanctioned the study and tasked the division officer with conducting the study.
- The assistant department head of Materials Management who was not present during the actual study. However, he was given the assignment of overseeing implementation of the results of the study.
- The assistant department head of Material Operations who arrived during the final stages of the benchmarking study and served as the key administrator of the Sterile Processing Division, the division where the benchmarking study was focused.
- The division officer of Sterile Processing who was responsible for the day-to-day operations of the process.
- The supervisor of Sterile Processing who manages the personnel engaged in the new process.
- The technician of Sterile Processing who was peripherally involved in the study.
- The Program Director of the Office of Continuous Improvement who had involvement in the command's development of their mission, vision, and strategic plan.

Interview questions were faxed to the assistant department head for distribution before arrival of the researcher. Interviews lasted approximately one (1) hour and the questions listed in the appendix were asked of each of the seven (7) interviewees. Participants answered all of the questions except the supervisor of the Sterile Processing Division and the technician within the division.

Both were not able to answer some questions because of time on the job and level of involvement in study. During each session notes were taken and a tape recorder was used to fill-in gaps of written notes. All participants spoke candidly about their experience with the benchmarking study. At the conclusion of each interview, participants were asked if they were interested in the findings of the study, and four of the seven participants expressed interest.

The researcher conducted an informal interview with an expert in logistics and benchmarking. This was done to gain a frame of reference for the specific area of logistics benchmarking.

d. Document Reviews

At the time of the site visit, the command's strategic plan, training records and award citations were reviewed to support specific responses given by interviewees during interview sessions. The command's strategic plan was used because it provides the framework within which the organization operates. It delineates why the organization exists, its purpose, when and how it intends to accomplish its objectives. Training records were used because they revealed who had received related training in benchmarking. Finally, award citations were used to determine the type of rewards and incentives given to the benchmarking team by command leadership.

e. Observations

The observations ranged from evaluating the climate of the department to considering the physical office environment. The evaluation of the climate of the department was performed to uncover factors pertaining to quality of interpersonal dynamics, readiness for change, and quality of communication. The physical environment was

considered because it provided insights on how benchmarking information was publicized in the work spaces.

2. Analytic Strategy

This section describes how conclusions from literature reviews, interviews, document reviews, and a site observation were used to answer the primary and secondary research questions outlined in Chapter I of this thesis. A content analysis of the benchmarking literature was conducted to: (1) gain a consensus from the leading authors of the critical success factors for benchmarking, and (2) identify the most appropriate model for describing and analyzing the case study. Content analysis of the interview transcripts, notes, and documentation served as the foundation for writing the benchmarking case. Interview content analysis uncovered hindering factors, positive factors, and lessons learned. Finally, a comparison of the literature to the MMD experience was conducted to evaluate the success of the MMD benchmarking study.

III. LITERATURE REVIEW

This chapter reviews the benchmarking literature and focuses on determining the critical success factors for benchmarking. The chapter begins by defining benchmarking and describing reasons for benchmarking. The chapter concludes by examining the critical success factors for benchmarking and identifying the resources required to perform a benchmarking study.

A. BENCHMARKING DEFINED

In the late 1970's, Xerox Corporation had experienced major losses of market share to foreign competition. Afterwards, the corporation began an ambitious total quality management program to regain those market shares. The corporation used benchmarking to reclaim its competitive edge in the face of intense global competition. Xerox's Robert C. Camp pioneered the technique and defined it as, "The search for industry best practices that lead to superior performance." (Camp, 1989, p. 12)

Today, definitions of benchmarking abound. The American Productivity and Quality Center (APQC) defines it as, "The practice of being humble enough to admit that someone else is better at something and wise enough to try to learn how to match and even surpass them at it." (APQC, 1994, p. A-5) A practitioner defines it as, "A continuous search for and application of *significantly better practices* that leads to superior competitive performance. [italics added]." (Watson, 1993, p. 2) An expert described benchmarking as, "The process of understanding your performance, comparing it against the performance of best-in-class companies, learning how they perform better, and using that information to improve." (George, 1992, p. 75)

To this end, benchmarking can be summarized as a quality management tool used by organizations to accelerate change and maximize their competitive advantage through identifying and applying best practices.

While understanding what benchmarking is is vital, knowing what it is not is just as significant. Often organizations misunderstand benchmarking and benchmarking studies fail because people use the technique in situations that are incompatible with its original intent. Camp (1989) insists that benchmarking is not, "A mechanism for determining resource reductions although resources are redeployed in the most effective way of supporting customer requirements and obtaining customer satisfaction as a result of benchmarking activities." (p.14) Other authors profess benchmarking is not imitating, collecting statistics, visiting sites, or keeping to a standard by which something can be measured or judged, nor is it limited to a specific industry (DeToro, 1995; Grayson, 1994; Sheridan, 1993; Tutcher, 1994; Vasilash, 1994). It is not a cure all for all the ills existing in an organization.

This study defines benchmarking as,

> The process of understanding your performance, comparing it against the performance of best-in-class companies, learning how they perform better, and using that information to improve. (George, 1992, p.75)

This definition is comprehensive, understandable, and relevant. It provides the researcher focus for the content analysis of the literature, assessment of interview responses, and derivation of lessons learned during the benchmarking study performed in the Materials Management Department at NMC San Diego.

Finally, before concluding this section it is important to note that the literature includes four types of benchmarking studies:

- **Internal.** An organization compares its own process with that of a similar or dissimilar process within the same organization(DON TQL Office, 1996).

- **Competitive.** An organization compares itself against its rivals in the same industry (Camp,1989; DON TQL Office, 1996).

- **Functional.** An organization compares a job or function (i.e. marketing, warehousing, records keeping, etc.) to another organization in the same or different industry (Camp, 1989; DON TQL Office, 1996).

- **Generic.** An organization looks at the same function in similar or dissimilar industry (Camp, 1989; DON TQL Office, 1996).

B. REASONS FOR BENCHMARKING

Organizations initiate benchmarking studies for a variety of reasons. According to the literature they use it to:

- **Set Goals and Objectives.** Benchmarking forces an organization to move from an internal improvement focus to looking externally for improvement goals. This external comparison gives the organization a broader perspective of the effectiveness and efficiency of their processes as compared to "best-in-class" organizations. For example, a group of individuals in one firm meets annually with a group of individuals from another firm at a "leadership summit" to compare business strategies and exchange business ideas to maintain a competitive edge in their industry (Fisher & Larsen, 1996). Motorola, another example, encourages its suppliers to look

internally then look to others for ways to continually set new standards to improve their performance in the marketplace (Spendolini, 1992). This process helps Motorola and their suppliers because a continuous process improvement loop is established that relates to how to set goals and objectives (Spendolini, 1992).

- **Enhance Continual Improvement.** Benchmarking encourages an organization to continually learn from others to improve procedures, methods, and plans. In Eastern Technologies' case they fine tuned their setup procedures for new accounts by serving as a repository for firms to suggest new ways of doing business (Beasley & Cook, 1995).

- **Improve Customer Satisfaction.** Benchmarking can improve customer service by continually and systematically analyzing customer opinion. For example, organizations in the hospitality industry can use a combination of, "customer surveys, focus groups of previous and potential customers, use of fictitious guests, operational analysis of performance, employee circles, and employment of seasoned consultants" to analyze customer patterns. Firms then benchmark this data against their competitors in the marketplace (Yasin & Zimmerer, 1995).

- **Understand World-class Performance.** Benchmarking encourages firms to seek out best-in-class organizations and work to emulate applicable processes. One electronic control manufacturer confronted with increased competition, dwindling profits and decreasing market shares looked to world-class performers to find solutions to improve the quality of their product parts and replacement components (Ventucci, 1992).

Whatever the motivating factor(s), an organization should recognize that benchmarking is most notable for improving processes to gain a competitive advantage. The

decision to benchmark should not be based upon some short-term crisis but to gain a long-term competitive edge.

C. THE BENCHMARKING PROCESSES

An important part of benchmarking is selecting a benchmarking process that will lead to a timely, practical, and a successful outcome. An organization should answer two questions to decide which model best serves their purpose. First, does the process take a system's view of benchmarking? Second, are the steps in the model comprehensive? Organizations are "Open systems that are influenced by a multitude of environmental forces or inputs such as availability of raw materials, changes in technology, competition, changing worker values, governmental policies, and so forth." (Bowditch & Buono, 1990) Open systems "interact with their environment and are influenced by external forces." (Bowditch & Buono, 1990) Thus, for a benchmarking model to have a systems view, it must take into account the entire organization. This includes the human, structural, and mechanical dimensions and the environment within which the organization exists.

A benchmarking model is comprehensive when it addresses in detail all steps required to conduct a successful benchmarking process and is easily understood by the benchmarking team and members of an organization.

Keeping in mind the requirement for a system's view and comprehensiveness, three models were analyzed: a Four-Step Process Model, a Nine-Step Quality Improvement Process, and a Ten-Step Benchmarking Model.

1. Four-Step Benchmarking Model

Figure 3.1 illustrates the American Productivity and Quality Center (APQC) Four-Step Benchmarking Model. This

model, along with four others is presented during a two-day course sponsored by the APQC (APQC, 1994).

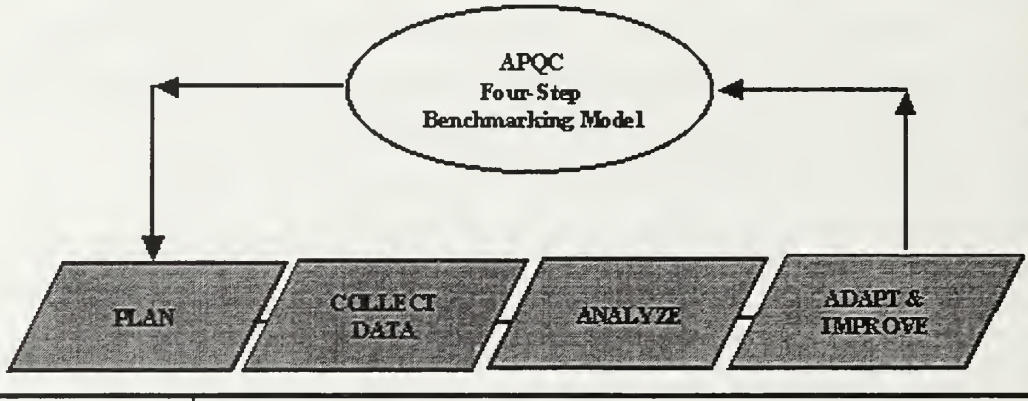

Figure 3.1 APQC Four-Step Benchmarking Model

Step 1. Plan

Senior leadership forms a benchmarking team. The team's membership should consist of stakeholders of the process. Stakeholders are individuals and groups inside or outside the organization who affect and are affected by an organization's, group's or processes' mission, goals, and strategies. The team selects the process that is benchmarked. They define the scope of the study, determine the type of benchmarking effort, flowchart the internal process, and identify partners to benchmark (APQC, 1994).

Step 2. Collect Data

The benchmarking team determines methods of data collection (i.e. telephone or mail surveys, site visits, telephone interviews, face-to-face interviews, etc.). Data is collected from internal and external sources, and it is then matched (APQC, 1994).

Step 3. Analyze

The benchmarking team analyzes the data and determines performance gaps. The team assesses practices, methods, and procedures of best-in-class (APQC, 1994).

Step 4. Adapt and Improve

The benchmarking team communicates findings to senior leadership for acceptance. Once accepted the team develops a plan of action to implement the results and consistently recalibrates its findings (APQC, 1994).

The APQC Four-Step Benchmarking Model is a good model for organizations that are just starting their benchmarking effort. Remembering it is easy and is applicable to most benchmarking studies. One shortcoming of this model is that it may not meet the need of some government organizations to have detailed instructions for each phase of the model. Another drawback is that the model gives little attention to a system's approach to benchmarking. Otherwise, this is a reliable model.

2. Xerox Corporation Nine-Step Quality Process

The Nine-Step Quality Improvement Process was developed by Xerox Corporation (Figure 3.2). Essentially, Xerox benchmarks at every step of the Quality Improvement Process, always comparing their results with competitors or best-in-class companies for that particular process (Xerox, 1993).

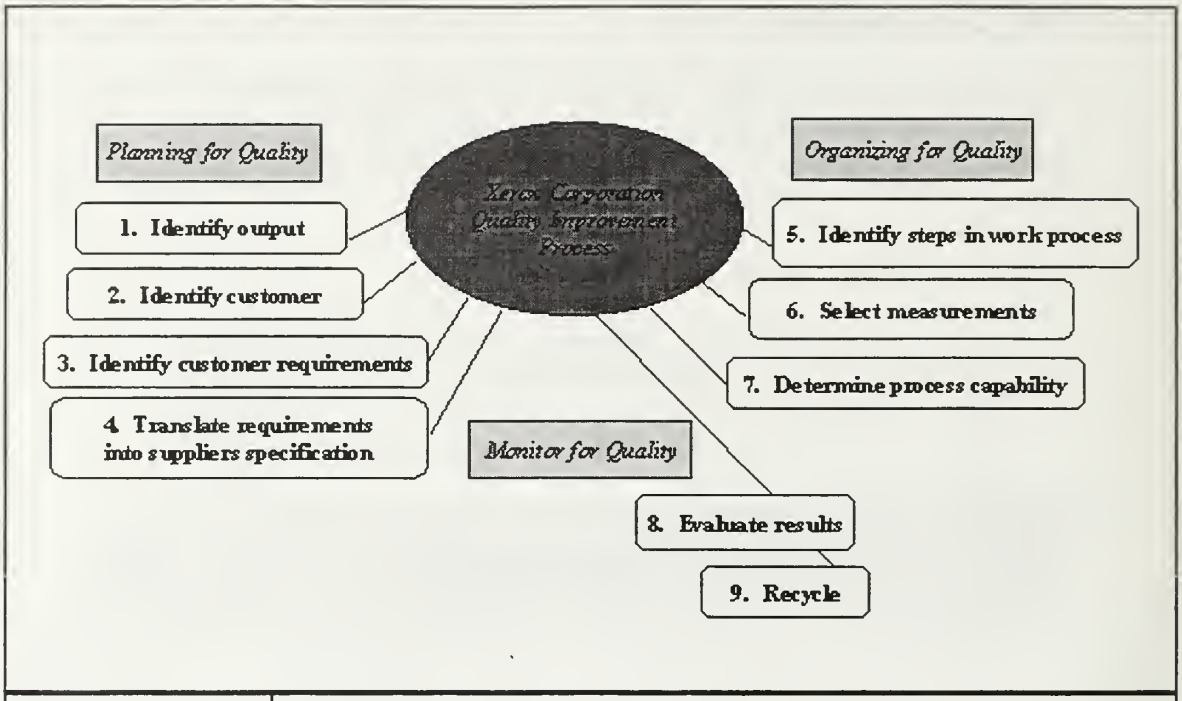

Figure 3.2	Xerox Corporation Quality Improvement Process

Step 1. Identify Output

The individual or group determines the product desired and then compares their findings against their competitor's product (Xerox, 1993).

Step 2. Identify Customer

The individual or group determines who the customer is for the process and then compares findings against their competitor's data (Xerox, 1993).

Step 3. Identify Customer Requirements

The individual or group determines the needs of the consumers of the product and then compare findings against their competitor's data (Xerox, 1993).

Step 4. Translate Requirements into Supplier Specifications

The individual or group communicates the needs of consumers to suppliers and then compares results against their competitor's data (Xerox, 1993).

Step 5. Identify Steps in Work Process

The individual or group determines what tasks need to be performed before a product is placed on the market and then compares the process against their competitor's process (Xerox, 1993).

Step 6. Select Measurements

The individual or group identifies how outcomes are evaluated and then compares the process against their competitor's outcome data (Xerox, 1993).

Step 7. Determine Process Capability

The individual or group identifies strengths and weaknesses of current procedures and then compares the process against their competitor's procedures (Xerox, 1993).

Step 8. Evaluate Results

The individual or group assesses outcomes of processes and then compares the results against their competitor's data (Xerox, 1993).

Step 9. Recycle

The individual or group makes improvements where necessary and then compares the results against their competitor's data (Xerox, 1993).

This nine-step quality improvement process is excellent for an organization that is more experienced in benchmarking. This is a mature benchmarking model in that the preparatory steps generally outlined in other models are not detailed in this model. Another unique characteristic

of this model is that it is not limited to a group conducting a benchmarking study; an individual can use the process. Overall, the process is most appropriate to offer an organization when it has quality immersed in its culture.

3. Ten-Step Department of the Navy (DON) Benchmarking Model

The final model analyzed was the Ten-Step DON Benchmarking Model as shown in Figure 3.3. The Office of the Under Secretary of the Navy Total Quality Leadership Office drafted this benchmarking model, which consists of four basic phases: Plan, Do, Study, Act. This model is similar to the Plan-Do-Check-Act Cycle: A Method for Continual Improvement taught in Total Quality Leadership training courses (Fundamentals of Total Quality Leadership, 1992).

Plan Phase

The Plan Phase of the DON Benchmarking Model begins with identifying operations that need improvement. In this phase a benchmarking team identifies, "what to benchmark, benchmarking partners from best-in-class and determines data collection methods." (DON TQL Office, 1996)

Do Phase

The Do phase consists of, "comparing internal versus external performance gaps." (DON TQL Office, 1996) In this phase a benchmarking team decides, "performance gaps and strengths and takes a system's view." (DON TQL Office, 1996)

Study Phase

The Study Phase involves assessing the, "acceptance of benchmarking." (DON TQL Office, 1996) In this phase a benchmarking team, "communicates benchmarking findings and gains acceptance, and supports and establishes functional goals." (DON TQL Office, 1996)

Act Phase

The Act Phase is the final phase in the process. It involves, "developing a method to carry out findings and to recalibrate when appropriate." (DON TQL Office, 1996) In this phase a benchmarking team, "develops an action plan, implements best practice procedures and monitors progress then recalibrates benchmarks." (DON TQL Office, 1996)

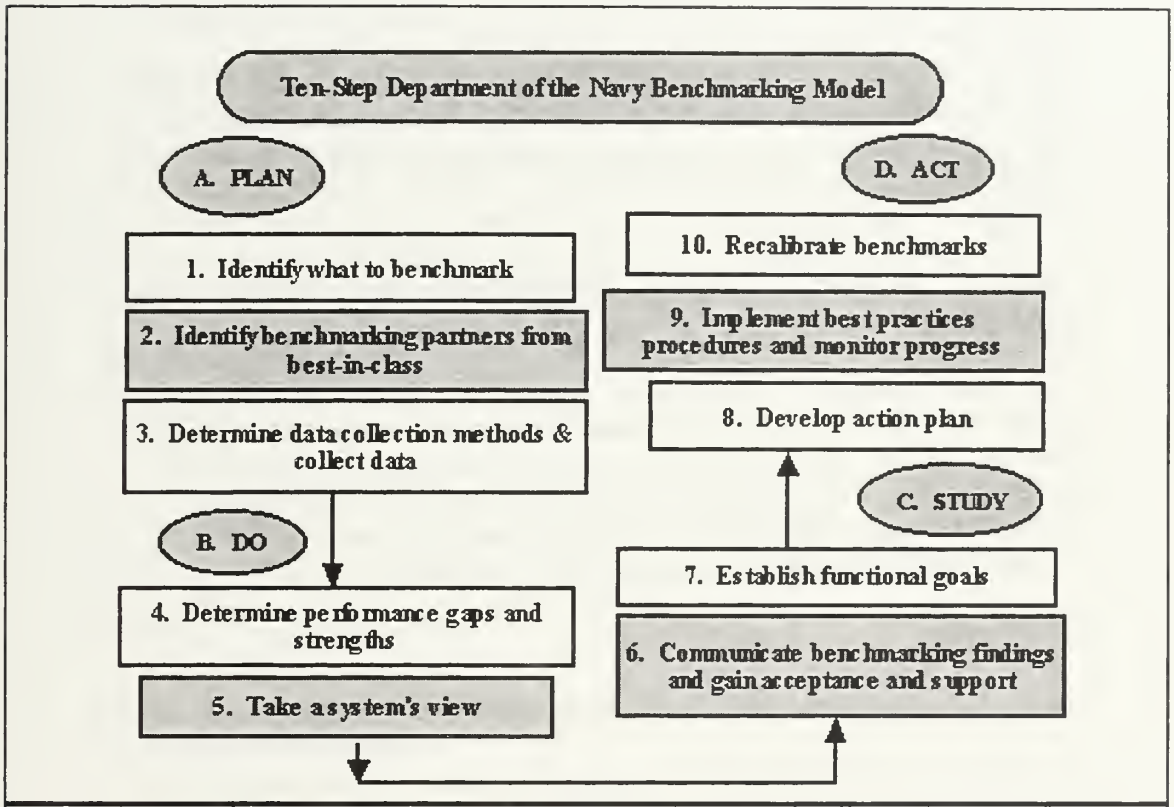
Ten-Step Department of the Navy Benchmarking Model
A. PLAN
1. Identify what to benchmark
2. Identify benchmarking partners from best-in-class
3. Determine data collection methods & collect data
B. DO
4. Determine performance gaps and strengths
5. Take a system's view
D. ACT
10. Recalibrate benchmarks
9. Implement best practices procedures and monitor progress
8. Develop action plan
C. STUDY
7. Establish functional goals
6. Communicate benchmarking findings and gain acceptance and support

Figure 3.3	Ten-Step Department of the Navy Benchmarking Model

Plan Phase

Step 1. Identify What to Benchmark

The Executive Steering Committee (ESC) identifies potential processes to benchmark. They identify a process that aligns with the organization's

strategic plan. They define the scope of the study, determine the benchmarking effort, and flowchart the broad functional process. The ESC then charters a benchmarking Quality Management Board (QMB) to serve as the champion of the potential process to benchmark. The QMB charters a Process Action Team (PAT) to carry out the study (DON TQL Office, 1996).

Step 2. Identify Benchmarking Partners from Best-in-Class

The PAT flowcharts the internal process. They then review literature, interview industry experts, and more to decide who is best-in-class. Afterwards they consider appropriate methods for data collection. Finally, the PAT flowcharts the process of the best-in-class (DON TQL Office, 1996).

Step 3. Determine Data Collection Methods & Collect Data

The PAT selects a method for data collection and then collects data from external sources. Once the data is collected the team match up common processes, procedures, or methods between the internal and external operations of each organization (DON TQL Office, 1996).

Do Phase

Step 4. Determine Performance Gaps and Strengths

The PAT evaluates the organization's practices in the process under study against that of industry's best to decide which practices, methods, or procedures should be changed. The PAT concludes its study by submitting a report of findings to the QMB (DON TQL Office, 1996).

Step 5. Take a System's View

The QMB evaluates the report from the PAT and determines impact on entire organization. The QMB makes recommendations to the ESC. The ESC reviews recommendations and analyzes the impact on the

organization's mission, vision, and strategies (DON TQL Office, 1996).

Study Phase

Step 6. Communicate Benchmarking Findings and Gain Acceptance and Support

The results of the study are told to the appropriate levels of the organization. Acceptance and support are sought from all appropriate levels of the organization (DON TQL Office, 1996).

Step 7. Establish Functional Goals

The ESC and QMB evaluate current jobs to decide if revisions should occur to align the process with accomplishing the command's strategic plan. They obtain a commitment from senior leadership to implement findings (DON TQL Office, 1996).

Act Phase

Step 8. Develop Action Plan

The QMB and PAT draft a plan of action for the implementation of the results. During this step they develop mechanisms to measure and monitor achievement of the benchmarking results (DON TQL Office, 1996).

Step 9. Implement Best Practices Procedures and Monitor Progress

The ESC approves the plan of action and allows process owners to implement changes (DON TQL Office, 1996).

Step 10. Recalibrate Benchmarks

At this step it is up to all levels of the organization to monitor the process and continuously improve upon it (DON TQL Office, 1996).

This model is most appropriate for organizations considering benchmarking for the first time or organizations that are experienced bench markers. It takes a system's view to benchmarking and is comprehensive. For.these reasons, the researcher selected the Ten-Step DON Benchmarking Model to evaluate the success of the benchmarking study and develop lessons learned from the process.

D. CRITICAL SUCCESS FACTORS FOR BENCHMARKING

This section discusses the critical success factors for successful benchmarking. Critical success factors are "those characteristics, conditions, or variables that have direct influence on customers' satisfaction with the output--product or service or both--of specific business processes and hence, are critical to the success of the entire business." (Watson, 1993, p.57) The following themes represent critical success factors for benchmarking:

1. Understand Your Own Process First

Experts in the field agree that firms gain the greatest insight about themselves when they conduct benchmarking studies (Petrick, Scherer, Watson, 1993; Westfall, & Wilson, 1994; Venetucci, 1992). As Eric Kennedy puts it, "You must have your own house in order." (Human Resource Planning, 1993) When organizations attempt to understand and document the process under study, they learn why they do the things they do and how these actions affect the external environment (Tutcher, 1994). For example, in the beginning of the AT&T Oklahoma City Works benchmarking experience, the team met regularly to: (1) discuss their benchmarking effort, (2) create measures of effectiveness, and (3) map current practices (Pulat, 1994). This initial work lead to more benchmarking studies conducted at AT&T and more

employees having a clear understanding of benchmarking (Pulat, 1994).

2. Make Benchmarking a Part of Strategic Planning

Several authors assert that making benchmarking a part of strategic planning fosters a philosophy of continuous process improvement throughout the organization (DeToro, 1995; Greengard, 1995; Tutcher, 1994; Watson, 1993). Organizations have two choices when integrating benchmarking with strategic planning. They can state it explicitly as a part of an organization strategy or they can develop goals and objectives that require the use of benchmarking to accomplish the mission and vision of the organization. For example, in the 1994 draft of the Naval Medical Logistics Strategic Plan, leaders in the medical logistics community stated "Benchmarking shall occur with other organizations." (Strategic Plan, 1994) By contrast, when Caterpillar, Inc. went through major restructuring, benchmarking emerged as a tool for implementing the strategic plans of their Technical Services Division (Mittelstaedt, 1992).

3. Leadership Support and Commitment

Benchmarking requires extensive leadership from senior managers in the organization, as for demonstrating commitment to the process, and, most important, providing the financial backing necessary to conduct the studies.

Many authors agree that without leadership support and commitment benchmarking teams could be given inadequate attention and resources (DeToro, 1995; Mittlstaedt, 1992; Tutcher, 1994; Watson, 1993). Becoming a champion is an ideal way to show commitment to the benchmarking process. A champion means "One that defends, fights for, or supports a cause or another person." (The American Heritage Dictionary, 1991, p.257) Robert Camp is a living example of

a champion. He is known around the world for his contributions to benchmarking at Xerox Corporation (Etorre, 1993). It is important for a champion to regard benchmarking as a viable tool to propel the organization to a higher plateau. Champions should be "encouraged from the top of the organization to pursue the study, and their results should be communicated to encourage others who need benchmarking. . ." (Watson, 1993, p.197).

4. Education and Training

Education and training in benchmarking process, tools, and techniques are critical to the success of the benchmarking effort (Mittelstaedt, 1992; Sillyman, 1992; Spendolini, 1992). It helps employees in understanding the process and transforming organizations. One author recommends that participants of benchmarking studies read books and articles about the topic plus attend conferences (Mittlesteadt, 1992). Xerox understood the importance of education and training. The leadership wanted company employees to embrace the "quality effort" so everyone in the organization was given training in quality skills and tools (Xerox, 1993). At Goodyear Tire and Rubber Co., employees received just-in-time benchmarking training when they are prepared to measure themselves against their competitors (Greengard, 1995).

5. Communication is Paramount

The entire literature emphasizes the importance of communication through all levels of the organization. Experts agree that when a people share a common set of objectives and an agreed upon view of the world, coordinated and focused action is much easier to accomplish (Camp, 1989; Leibfried and McNair, 1992).

Watson (1993) emphasizes the need to share benchmarking stories. When benchmarking stories are shared people are aware of the benefits and the organization has a greater chance at performing a successful benchmarking study (Watson, 1993). Nationally, AT&T bench markers share their stories on-line (Pulat, 1994). Specifically, AT&T Oklahoma City Works conducts "sharing forums" regularly to discuss benchmarking experiences (Pulat, 1994).

6. Provide Adequate Resources

The literature states that benchmarking requires a considerable commitment of time, talent and other resources.

a. Time Commitment

Two sources asserted that managers frequently underestimate the time required to perform a benchmarking study (DeToro, 1995; Sheridan, 1993). Ironically, consultants seem just as guilty. In the case of a prominent firm, a benchmarking team was given four weeks to plan, collect, analyze, adapt and improve a process (Sheridan, 1993). This was an unusual case; rarely can any benchmarking study be completed in four weeks. One consultant exclaimed that it took six months, several experts, and numerous outside agencies to complete one benchmarking project (Ettorre, 1993). A representative from the AT&T Benchmarking Group had this say about time commitment: "It takes between four and six months for an average benchmarking project, maybe longer if you do not have much experience at it." (Mittelstaedt, 1992) One Malcolm Baldridge Award Winner claimed employees dedicated on average of five hours out of a 40-hour work week to their benchmarking effort (Godfrey, 1995). Overall, The American Productivity and Quality Center estimates that benchmarking teams meet one day per week and that studies be completed

within six months, although they can last from three to twelve months (APQC, 1994).

b. Proper Team Composition

Organizations should select people who represent different operations within an organization for the benchmarking team because they are the ones who will know the process and are able to correct problems (DeToro, 1995). The American Productivity and Quality Center recommends assigning individuals who have a genuine interest in either benchmarking or total quality management (APQC, 1994). Also, the center advocates creating benchmarking teams of five to seven people who can meet weekly (APQC, 1994). When Kodak's Human Resources Department wanted to do a benchmarking study, they not only selected individuals who were stakeholders of the process but also individuals who were not familiar with the process; these individuals could bring a different perspective (Greengard, 1995). Generally, a smaller group is easier to manage. The people assigned to benchmarking teams should have a personal stake in the process. Making team membership mandatory or selecting individuals for the team that are not interested in benchmarking is counter productive to a successful benchmarking study.

c. Cost

Finally, organizations that have completed benchmarking projects report that they have spent between $25,000 and $150,000 (Buckler, 1994). An analysis conducted by the American Productivity & Quality Center echoed these findings by revealing that the average cost to complete a study ranges from $35,000 to $70,000 (APQC, 1994). The money spent on benchmarking studies is allocated to items such as: team training, searches, site visits, implementation costs,

membership fees, annual fees, and initiation fees. For example, if an organization were seeking membership into the International Benchmarking Clearinghouse, they would pay an annual membership fee of $6,000 along with a one-time initiation fee that could be as much as $12,500 (the amount depends on the number of employees in the organization (APQC,1994).

Overall, the time, talent, and other resources required to complete a benchmarking project is dependent upon the magnitude of the study and the number of employees in the organization (Buckler, 1994). However, the savings from this kind of investment is invaluable. One organization reported saving between $5-$6 million annually as a result of performing a benchmarking study (Buckler, 1994). In the case of Xerox, they saw remarkable savings in labor and productivity. The rejection rate of defective machines was reduced too less than ten percent. The distribution productivity went from 5 percent to 10 percent, and a dramatic decrease in service labor cost occurred (Mittelstaedt, 1992).

E. SUMMARY

This chapter began with discussing what benchmarking is and what it is not and reasons for benchmarking. While understanding that benchmarking is a useful tool for managers to improve customer satisfaction knowing that benchmarking cannot cure all the ills of an organization is important. Benchmarking reasons stem from its ability to help organizations assess their internal processes before looking externally for improvement goals. The area an organization is interested in improving can lead to a benchmarking study being done.

The remaining section discussed the benchmarking model used to evaluate the benchmarking study and the critical success factors for benchmarking. Three benchmarking models were analyzed: a Four-Step Process Model, a Nine-Step Quality Improvement Process, and a Ten-Step Benchmarking Model. The Ten-Step Department of the Navy Benchmarking Model was selected because it met the researcher's requirement for a system's view and comprehensiveness. This model is designed for new or seasoned bench markers. The model offers a great deal of detail and guidance for bench markers to do a reliable benchmarking study.

As previously mentioned, the critical success factors for benchmarking were discussed. These essential characteristics should exist before a benchmarking study is initiated in an organization. The most common factors that emerged from the literature were understanding your own process first, benchmarking should be a part of strategic planning, leadership support and commitment are important, education and training are necessary, communication is paramount, and adequate resources are required. The importance of each critical success factor should not be underestimated because together they represent a model framework for benchmarking success.

IV. THE CASE STUDY

This chapter presents the study conducted in the Materials Management Department (MMD) at the Naval Medical Center (NMC) San Diego. The first section describes the study. The final section summarizes responses from the interview questionnaire.

A. BACKGROUND

The study was conducted in the Sterile Processing Division within the Materials Management Department of the Naval Medical Center San Diego. The Sterile Processing Division is responsible for sterilizing and wrapping instrument sets for surgery. The division sanitizes surgical instruments with Ethylene Oxide (EtO) sterilizers that use chlorofluorocarbons (CFCs). Ethylene oxide is,

> a colorless, flammable toxic gaseous or liquid compound C_2H_4 made by reaction of ethylene chlorohydrin and alkali or by catalytic oxidation of ethylene and used chiefly in organic synthesis (as of ethylene glycol and ethanolamine) and in sterilization and fumigation. (Webster's Third New International Dictionary, p.781)

A chloroflurocarbon (CFC) is,

> any various halocarbon compounds of carbon, hydrogen, chlorine, and fluorine, once used widely as aerosol propellants and refrigerants. Chlorofluorocarbons are believed to cause depletion of the atmospheric ozone layer. (The American Heritage Dictionary of the English Language, 3rd, p. 336)

Both are harmful to your health. Scientific research indicates that CFCs thin the ozone layer and ethylene oxide pollutes the air (L.A. Times, 1994).

The United States Congress and local governments have taken steps to minimize the harmful effects that these substances have on humans, crops, and marine life by promulgating legislation. For example, the Congress has imposed a hefty excise tax on the carrier gas CFC in hopes of discouraging future use and production. Also, several state governments now require manufacturers to find alternate ways to minimize ethylene pollution.

The medical industry relies heavily upon a mixture of 12% chlorofluorocarbon (CFC-12) and 88% ethylene oxide (EtO) to sterilize medical instruments (OR Manager, 1994). The new mandates have forced many medical facilities, including the Materials Management Department at NMC San Diego, to find alternative methods of sterilization. The following paragraphs describe the benchmarking study conducted to determine the most ecological method of sterilization.

B. THE STUDY

1. Planning Phase

a. Identify What to Benchmark

In March of 1995 the Sterile Processing Division began studying their sterilization process. The head of the Materials Management wanted to: (1) comply with federal regulations, (2) minimize employee exposure to known carcinogens, and (3) eliminate equipment that polluted the air. The department head recommended the Sterile Processing Division conduct a benchmarking study to determine the best method of sterilization. He had heard of benchmarking during professional conferences and strategic planning efforts and was familiar with its benefits. Shortly after his recommendation a team was formed. The team consisted of four people:

- The assistant department head of Materials Operations;
- The division officer of Sterile Processing;
- The supervisor in the Sterile Processing Division; and
- The operating room nurse.

Initially, study team members were not assigned specific roles (i.e. Executive Champion, Benchmarking Manager, Research Manager, Information Specialist, or Project Facilitator) to perform during the study. Further along in the process, the assistant department head of Materials Operations became the team leader. The department's training report indicates that most of the members on the team had little experience with benchmarking, little training in total quality leadership, and minimal exposure to others who had conducted benchmarking studies. The interviewees were not sure if any of the team members ever had seen a successful benchmarking study. There was no evidence of the team being given a charter by a Quality Management Board that explained their scope, delineated possible time lines, identified the type of benchmarking effort, listed critical success factors, or specified desired outcomes for their study. Therefore, the team appeared to have little guidance from higher authority and less knowledge of the overall impact of their study on the command's strategic plan. According to interviewees, the team gave little attention to using benchmarking models or flow charts to explain their processes. The department head was available to answer questions if the team encountered a problem.

The interviewees were asked general questions regarding the formulation of the team. Three of the seven interviewees were not aware of the exact composition of the team, for one of the following reasons: (1) the interviewee was peripherally involved in the study, (2) the interviewee was not present during the study, and finally (3) the Director of the Continuous Improvement Office was not aware of the study being conducted. The research indicated that there were five key players during the study, and they were responsible for the following:

- The assistant department head of Materials Operations led the initial phase of the study. By default, he became the leader of the study because he was the administrator over the Sterile Processing Division. Later, the assistant department head was replaced after receiving orders to a new duty station.
- The division officer of Sterile Processing served as the manager who was most familiar with the sterilization process.
- The supervisor of Sterile Processing served as the resident expert on sterilization.
- The operating room nurse represented the surgery department who was a major user of sterilized surgical instruments. This individual also possessed the knowledge about plasma sterilizers.

Based on the interview data, it appears that no formal appointments were made to this team. Additionally, the data did not show a cross representation of customers or involvement of other members in the Materials Management Department (e.g. enlisted personnel or civilians).

With the exception of one interviewee, the informants agreed that the motivating factors behind the

study were not related to a fear of a base closure, visionary leadership, competition, or downsizing. The primary reasons for the study were to comply with federal regulations, to minimize known human carcinogens, and to eliminate equipment that polluted the air. During the planning phase of this study, a limited number of manufacturers were identified for best-in-class. The selection of the manufacturers was based upon the prior knowledge of a team member. There was no evidence that a formal plan of action was developed.

Most of the interviewees were unable to give a precise account of all the steps that occurred when the team conducted the study. For the most part, the informants did not recall the use of a benchmarking model or specific reference materials. The interviewees were comfortable estimating that the study took less than a year to complete and they felt that the time devoted to the study was reasonable for the task assigned.

b. Identify Benchmarking Partners from Best-in-Class

Before identifying partners from best-in-class the team needed to answer three critical questions: (1) should they retrofit the current system with hydrochloroflouro-carbons vice chloroflourocarbons, (2) should they purchase a 100% EtO Sterilizer, or (3) should they completely replace the existing system with a plasma sterilizer? The type of study conducted would be based upon answers to the above questions. A cost analysis indicated that retrofitting or purchasing new EtO Sterilizers would be cost prohibitive. Additionally, the use of EtO Sterilizers would require compliance with strict air pollution regulations. The team concluded that the best alternative was to completely

replace the existing system with a plasma sterilizer. The team then identified Johnson & Johnson and Abtox as two manufacturers of plasma sterilizers. The two manufacturers were selected based upon the operating room nurse's prior knowledge of firms that manufactured plasma sterilizers.

c. Determine Data Collection Methods & Collect Data

The team used newspapers, articles written in professional journals, and telephone interviews to collect data related to these two manufacturers of plasma sterilizers. This method of data collection was selected because a majority of the information was readily available in the medical library of the Naval Medical Center San Diego. The data then was matched in the following areas: (1) processing time, (2) limitations of system, (3) advantages of system, (4) approval or disapproval status of the system by the Food & Drug Administration (FDA), and (5) application of the system to heat-sensitive equipment.

2. Do Phase

a. Determine Performance Gaps

It was difficult to measure performance gaps in this study because the study was not focused on comparing the MMD sterilization process to best-in-class processes at other medical facilities.

b. Take a System's View

It was clear that the team was concerned with minimizing employee exposure to and elimination of equipment that caused pollution; however, according to interviewees, the driving force behind the study was to ensure compliance with federal regulations. The team concluded that the plasma sterilizer manufactured by Johnson & Johnson offered the best features needed by NMC San Diego. To the best of

the knowledge of the interviewees, these findings from the study were not formally presented to a senior management board for review or comment.

3. Study Phase

a. Communicate Benchmarking Findings and Gain Acceptance and Support

The team prepared a report of their findings and submitted the information to the department head. The department head was pleased with the findings and approved the purchase of the plasma sterilizer manufactured by Johnson & Johnson. The news regarding the purchase of the plasma sterilizer was shared with members of the medical staff, operating room nurses, and technicians who depended on sterilized medical instruments to perform their jobs. According to interviewees, each group welcomed the new technology and regarded it as a plus for the environment and employee exposure to hazardous substances.

b. Functional Goals

To the best of the knowledge of the interviewees, new functional goals were not incorporated into the command's strategic plan by the ESC. The results were implemented at the department level by department personnel. Neither the ESC nor any QMB had the opportunity to witness implementation of any of the new practices discovered during the study because they had not sanctioned the study and were not aware of the study occurring.

4. Act Phase

a. Develop Action Plan

Since the team did not develop a formal plan of action to implement the new sterilizer, it was difficult to track how the team intended to measure the results of the study. Basically, the plan of action centered around

informal verbal agreements between team members and the department head to initiate the procurement process of the new sterilizer. The department head had final approval of the purchase of the new equipment, according to interviewees.

b. Implement Best Practice Procedures and Monitor Progress

After Johnson & Johnson was selected as the manufacturer of choice, a visit to the plant where the plasma sterilizer was manufactured took place. The team was convinced that the sterilizer by Johnson & Johnson was the best system to implement in the Sterile Processing Division. Acquisition of the system was initiated. The system arrived within 4-6 months after the initial paperwork was done. The system has self monitoring capabilities that measure the level of living bacteria and other microorganisms during the sterilization process, therefore little human interaction is required and measurement of original study goals is maintained.

c. Recalibrate Benchmarks

By the end of the study, the team had accomplished what it had set out to do. The team satisfied the needs of the hospital by successfully finding a system that could comply with federal regulations, minimize employee exposure to known carcinogens, and eliminate equipment that polluted the air. The study neither lent itself to instituting formal procedures to recalibrate the benchmarking effort, nor did it put any standardized procedures in place to identify emerging world-class processes for sterilization.

C. INTERVIEW RESPONSES

In addition to describing the study process, interviewees were asked a number of questions related to the

support the study received, lessons learned, and benefits of conducting the study. These responses are summarized using the categories of the interview questionnaire (Appendix).

1. Benchmarking Defined

For this study, the researcher defined benchmarking as,

> The process of understanding your performance, comparing it against the performance of best-in-class companies, learning how they perform better, and using that information to improve. (George, 1992, p.75)

One interviewee defined benchmarking as, "A reference point, a landmark." The researcher gathered that this definition was similar to the one given in the American Heritage Dictionary. Another respondent defined benchmarking as, "A process that you are doing now and compare it with other processes that are similar and you try to do a better job," while another defined it as, "Looking at what other facilities are doing and seeing how your organization can adopt those practices. Ultimately, you may or may not adopt the practices."

2. Leadership Support

It was difficult to identify leadership support during the study. Perhaps, the best illustration of this point is the comment made by an interviewee. The interviewee remarked that he, "Was not aware of top level management support but did know that the team had the support of the department head." This was a regular sentiment among most of the interviewees except for the department head who had this to say, "Support was provided by command leadership via monetary funds to purchase the new equipment." It was clear from the interviews that there were different interpretations of what leadership support and commitment is

and is not. Other issues of concern to the researcher were, involvement of a champion in the study and the integration of benchmarking into the command's strategic planning process. To the best of the knowledge of the interviewees, a champion was not identified during the study. Also, most of the respondents could not recall if benchmarking was integrated into the command's strategic plan. The exception was the Director of the Office of Continuous Improvement who said, "No, benchmarking is not integrated into the command's strategic plan."

3. Other Organizational Expertise

"Nursing Services may have done some benchmarking," one respondent explained. Another respondent said, "The command does perform comparative data analysis in some clinical and administrative areas." For the most part, the interview sessions revealed that other areas in the hospital may conduct modified benchmarking efforts; however, these resources were not sought out at the time of the benchmarking study.

4. TQL Office

According to the Director of the Office of Continuous Improvement and one interviewee, benchmarking was discussed in Total Quality Leadership training courses offered by the command. Unfortunately, the other interviewees were unable to give substantial information regarding Total Quality Leadership training courses offered by the command or discuss the assistance the team obtained from the TQL office at the time of the study.

5. Education and Training

There was not a consensus from interviewees on the level of education and training provided to the team. In general, interviewees could not recall what training the

team may or may not have received at the time of the study. Finally, a review of the department's training report was performed. Establishing the level of education on benchmarking for the team was difficult because the Staff Education and Training Department's Standard Personnel Management System reflected a roster that consisted of staff currently assigned to the command. This limited the researcher's ability to analyze the type of training the team had received. From a broader perspective, it still is important to note that of the 182 people assigned to the Materials Management Department only 25 had received training in the Introduction of Total Quality Leadership. Specifically, two of the six interviewees had attended this training. Further research revealed that, 4 out of the 182 people had training in the tools of Total Quality Leadership and none of the six interviewees from the Materials Management Department had received this training.

6. Lessons Learned

Deriving the lessons learned from this study was not difficult for the interviewees. They commented on the importance of having defined goals before a benchmarking study is conducted. Second, they advised that anyone considering a benchmarking study should take into account the needs of the organization, the benefits of benchmarking, and the competitive advantage benchmarking offers. At the conclusion of this question and answer period, one interviewee pointed out a major shortcoming of the study. They explained, "The federal regulation was driving the change in the organization and not the desire to be the best-in-class or improve one's competitive position."

7. Follow-up

According to most of the interviewees, they could only speculate that all of the results of the study were adopted by management and top leadership. This was not the case for the department head who was confident that all results of the study were adopted. In general, the interviewees recognized the benefits of benchmarking and would consider participating in future benchmarking studies.

8. Rewards and Incentives

Most of the interviewees were aware of the recognition the team members received for their contribution towards the study. The military members earned achievement medals and the civilian members earned cash awards for their contributions toward the completion of the project. The research revealed that the team members were given awards that were comparable in significance to other awards given at the command.

9. Public Relations

Without exception, the interviewees agreed that publicizing benchmarking success stories was not a part of the command culture. In spite of this, three interviewees did mention that a report of the study was prepared and submitted to a professional medical leadership conference.

V. ANALYSIS AND CONCLUSION

This chapter analyzes the case data collected on the study conducted by the Sterile Processing Division in the Materials Management Department at NMC San Diego. It includes an assessment of the research questions delineated in Chapter I and an analysis of the Materials Management Department study against the framework of the critical success factors for a study discussed in Chapter III. It also identifies areas for future research.

A. MATERIALS MANAGEMENT DEPARTMENT EXPERIENCE VERSUS INDUSTRY THOUGHT

How does the Materials Management Department experience compare with industry thought regarding benchmarking?

To answer this question the case study was compared with the definition of benchmarking, the reasons for benchmarking, the Ten-Step Department of the Navy Benchmarking Model, and the critical success factors discussed in the literature review.

1. Definition of Benchmarking

As discussed in Chapter III the definition of benchmarking used for this study was,

> The process of understanding your performance, comparing it against the performance of best-in-class companies, learning how they perform better, and using that information to improve. (George, 1992, p.75)

Interviewees had slightly different definitions of benchmarking which highlighted some of the elements outlined above, but were not as comprehensive. Most understood that benchmarking involved comparison with others, but not everyone understood that benchmarking is a defined process, nor that comparisons are made against "best in class"

processes. There was little evidence to show that standard methods (i.e. gathering customer satisfaction data, flowcharting or maintaining process metrics) were used to understand current performance. Additionally, there was no evidence that efforts were made to identify "best-in-class" organizations for comparison; the study concentrated on comparing two types of sterilization equipment.

2. Reasons for Benchmarking

As noted in Chapter IV, the Materials Management Department decided to conduct a benchmarking study to:

- Comply with federal regulations,
- Minimize known human carcinogens, and
- Eliminate equipment that polluted the air

Although laudable, these reasons do not address what the literature says a organizations should consider before undertaking benchmarking. Specifically, the literature asserts that one reason benchmarking studies are conducted is to set goals and objectives for comparing organizational processes with "best-in-class" processes in other organizations. The goals and objectives noted above do not include a desire to compare the effectiveness and efficiency of the Materials Management Department's sterilization process to "best-in-class" sterilization processes.

Additionally, although the Materials Management Department study did result in enhanced productivity (another reason noted in the literature), this was not a reason the study was undertaken.

Another reason organizations conduct benchmarking studies is to continually improve their procedures, methods and plans. Improvements were realized in the areas of

safety and regulatory compliance. However, there was nothing in the data to suggest an emphasis on continual improvement in these areas nor any emphasis on continual improvement in other areas of sterilization quality such as sterilizing surgical instruments quicker. These types of improvements were not reasons the study was undertaken nor were they a criteria for selecting a specific sterilization system.

Organizations also conduct benchmarking studies to enrich customer satisfaction by constantly analyzing customer feedback and comparing it to "best-in-class" organizations. Though the department head was pleased with the results of the study and the surgical staff welcomed the new technology, establishing feedback loops to continually monitor customer satisfaction against industry's best practices were not the motivators behind this effort.

Finally, organizations conduct benchmarking to understand and emulate world class performance. Once again, there was no data to suggest this was a reason for undertaking the Materials Management Department study.

3. The Ten-Step Department of the Navy Benchmarking Model

The following sections compare the Materials Management Department study to the Ten-Step Department of the Navy Benchmarking Model discussed in Chapter III. The analysis is organized into the four phases of the model (Plan, Do Study and Act).

a. Plan Phase

The model suggests that the ESC is involved in every phase of the benchmarking study. During the planning phase they identify the potential processes to benchmark (aligned with the command strategic plan) and charter

appropriate teams (QMBs and PATs). There was no evidence to show that the ESC was involved in any portion of the Materials Management Department study or that the study was linked to the strategic plan. Also, there was no evidence to show involvement by the ESC or that a charter had been given to the team.

Another portion of the Plan Phase is identifying "best-in-class" organizations to benchmark and collecting data from that organization. Though the team collected data on plasma sterilizers and selected a sterilizer that best met the needs of NMC San Diego, there was no evidence to show that the team had identified or collected data from world-class sterilization processes as part of their study.

The benchmarking team also flowcharts the process under study during this phase. As noted in the case, there was no data that showed any processes were documented in the sterilization processing division. Rather the study focused on an analysis of different types of processing equipment, which would normally only be part of a full benchmarking study.

b. Do Phase

In this phase, the PAT or other benchmarking team evaluates the organization's process against that of the benchmarking partner to discover performance gaps and strengths and submits a report of findings to the chartering QMB for further action. As the Materials Management Department study was focused on evaluating types of equipment verses comparing the Materials Management Department's sterilization process to a "best-in-class" process, this evaluation of performance gaps was not accomplished. An important element of the Do phase is taking into account the impact of the study recommendations

on the entire organization. This systems analysis does not appear to have been accomplished, perhaps because the department did not believe the study would have broad ranging effects on other areas of the hospital..

c. Study Phase

During the Study Phase, the model suggests that the benchmarking team present its findings to all appropriate levels of the organization and gain acceptance of their findings. The data shows that this was accomplished in the Materials Management Department study. The results of the study were presented to the decision-making authority (the Materials Management Department Head) and shared with and welcomed by surgical staff, the main customers. In addition, the study was presented at an external medical leadership conference. Although the study was not presented to the ESC, this appears appropriate given that the area under study was solely owned by the Materials Management Department Head, and that all outcomes from the study were implemented at the department level by department personnel.

Another portion of this phase is to establish goals to align the process with the command's strategic plan. This was not accomplished, however, given the fact that the study was specific to a process owned by one department it does not appear to have created systemic problems.

d. Act Phase

According to the model, during the Act Phase the QMB and PAT plan the implementation of the benchmarking results. The ESC approves this plan and the entire organization actively participates in the continued improvement of the new process. Although the team had a

verbal agreement with the department head to procure the new equipment, there were no documents that reflected a plan of action and milestones for the implementation of a new sterilization process. The team did accomplish what it had set out to do, which was comply with federal regulations, minimize known human carcinogens, and eliminate equipment that polluted the air. Other than meeting these goals, there was no evidence that procedures were put in place to continuously improve the process associated with the new equipment.

4. Critical Success Factors

a. Understand Your Own Process first

This critical success factor directly relates to the Plan Phase of the Ten-Step Department of the Navy Benchmarking Model. According to the literature, an organization should understand their internal processes before conducting a benchmarking study. As the analysis in section A.3.a indicates, a detailed understanding of the sterilization process was not undertaken. Although this did not affect the results of the study, it does lend credence to the idea that the study conducted was technically not a benchmarking study.

b. Make Benchmarking an Integral Part of Strategic Planning

The literature suggests that benchmarking be made an integral part of strategic planning. The case shows no evidence that benchmarking was either explicitly or implicitly articulated in NMC San Diego's strategic plan. In spite of this, the Director of the Continuous Improvement Office did say, "The command is looking at developing a department profile whereby department heads could track how well they were managing resources in comparison to practices

of other departments in the hospital." (Goff, 1996) In the final analysis, the researcher concluded that the integration of benchmarking into strategic planning is not yet a high priority for this command.

c. Leadership Support and Commitment

Benchmarking efforts are successful when they receive the necessary support and commitment from senior management. This aspect of the case was difficult to assess because the study was not directed by senior leadership. The researcher learned that the team received support from the department head; similar support was not gained from senior leadership (i.e. the Commanding Officer, the Executive Steering Committee, or the Quality Management Board) The limited involvement of senior leadership did not appear to be a problem because the study was contained within the Materials Management Department. The Department Head of Materials Management acted as the senior leadership and provided resources (i.e. time and money) and empowered the team to explore alternatives. Finally, though the department head chartered the benchmarking team, there was no evidence that he or anyone else acted as a champion to encourage the benchmarking effort.

d. Timely Education and Training is Important

The literature review indicates benchmarking education and training are key ingredients to an organization's benchmarking success. Interviews and training reports did not offer evidence that the team had received benchmarking training. There was some evidence that very general discussions on benchmarking were presented in some of the command's Total Quality Leadership courses. However, as noted in the case study, very few Materials Management Department personnel had taken advantage of these

courses. This lack of education and training in benchmarking may have contributed to the study being limited to an analysis of two types of sterilization equipment verses a full benchmarking study.

e. Communication is Paramount

According to the literature, communication with all levels of the organization is an important step to gaining acceptance of the benchmarking findings and informing senior leadership of the team's results. Though the team's findings were not communicated throughout the organization or with senior leadership, there is considerable evidence to conclude they were communicated to appropriate levels of the organization. Based on the Study Phase information the right people were informed.

f. Provide Adequate Resources

When an organization decides to benchmark, they should consider the team composition, the cost of the study, and time commitment of employees towards the benchmarking effort. The study showed four people participating in the effort, which appeared to be an appropriate number for this type of study. The composition of the team was restricted to individuals directly affected by the new sterilization process. There was little evidence available about the cost of the study to the command and the time commitment of the team members. There was some evidence to suggest that the department head was responsive to requests of the team especially when it was time to provide a timely approval of funds to purchase the new plasma sterilizer.

B. SUCCESSFUL IMPLEMENTATION OF BENCHMARKING

How successful has the Materials Management Department at Naval Medical Center San Diego been in implementing

benchmarking as required by strategic objective 2.5.43 of the 1994 draft of the Navy Medical Logistics Strategic Plan?

As the analysis above shows, the Materials Management Department study shows few of the elements of a benchmarking study. The researcher believes that a lack of understanding of benchmarking may have lead to a miscategorization of the study. Study participants were told to conduct a benchmarking study, but the research indicates the study performed was a cost benefit analysis of two types of sterilization equipment.

A cost benefit analysis is defined as,

> A systematic set of procedures by which a firm or government can assess whether to undertake a project or program and, when there is a choice among mutually exclusive projects or programs, which one to undertake. (Stiglitz, 1986, pp. 277-278)

There are two basic approaches to cost benefit analysis: private and social. A private cost-benefit analysis is performed in profit making organizations while a social cost-benefit analysis is germane to not-for-profit organizations. The social cost-benefit analysis was the appropriate method to assess the study performed by the team in the Sterile Processing Division. Social cost-benefit analysis involves,

> Determining the broader consequences (inputs and outputs) associated with a project, and the prices at which inputs and outputs are evaluated may not be market prices, either because the inputs and outputs are not marketed (so market prices do not exist) or because market prices do not accurately reflect marginal costs and benefits due to a market failure. (Stiglitz, 1986, p.278)

In other words, a social cost benefit analysis is a decision making tool that estimates the cost to society as a result of a prospective policy change. It also tries to assign a monetary value to the benefits an individual may or may not receive due to a prospective policy change. This results in an individual's cost being derived by placing a value on a person's leisure time and life. (Henderson, 1993; Stiglitz, 1986)

Although the Materials Management Department study was successful, the analysis shows that it technically was not a benchmarking study. Therefore, it did not meet strategic objective 2.5.43 of the 1994 draft of the Navy Medical Logistics Strategic Plan.

As described in Chapter IV, the Materials Management Department Head wanted to comply with new federal regulations, minimize employee exposure to known carcinogens and eliminate equipment that polluted the air. Specifically, the analysis was driven by a change to federal regulations and by a desire to minimize the individual's cost in terms of exposure to carcinogenic agents. These reasons are consistent with those noted above for a social cost-benefit analysis.

C. RECOMMENDATIONS FOR FUTURE RESEARCH

1. Feasibility of Benchmarking in Materials Management Departments in Navy Medicine

Benchmarking has served as a useful tool for many organizations. However, given the multitude of issues confronting Navy Medicine (e.g. capitation budgeting and managed care), what priority should be placed on implementing benchmarking in Materials Management Departments? By conducting a cost benefit analysis, leaders in the medical logistics community can determine some long-

term costs and benefits of the implementation of benchmarking in Material Management Departments.

2. Benchmarking Comparison Study

The researcher used a single case study strategy to assess one department's attempt to benchmark. A shortcoming of the approach in this case was that the application of the results were narrowed. Therefore, the researcher advocates the use of a multiple case study strategy, if resources permit. Such a strategy permits a broader application of the study results.

3. Assess the Results of the Integration of Benchmarking into a Strategic Plan

When an organization decides to benchmark, they are seeking a competitive edge, world-class status, and to become a leader in customer satisfaction. Integrating benchmarking into the organization's strategic plan is an important step towards attaining those successes as suggested in the literature. Assessing how best practice organizations integrate benchmarking into a strategic plan could assist Navy Medicine in adopting benchmarking as a strong element of their strategy.

D. SUMMARY

This chapter has answered the research questions and analyzed the study against the framework of the critical success factors for a benchmarking study. Answers to the research questions were gained by comparing the case study with the definition of benchmarking, the reasons for benchmarking, the Ten-Step Department of the Navy Benchmarking Model and the critical success factors. Although the study did result in enhanced productivity and improved safety and regulatory compliance, it was not a benchmarking study nor was it successful at carrying out

strategic objective 2.5.43 of the Naval Medical Logistics Strategic Plan.

The analysis of the study against the framework of the critical success factors for a benchmarking study resulted in the researcher concluding that the team was not a benchmarking group. The team consisted of people tasked to find the best sterilizer that would meet the needs of NMC San Diego. Benchmarking is a defined process and rarely do managers initiate benchmarking studies in the manner in which this study was done.

APPENDIX. INTERVIEW QUESTIONS

Date:_____ Time:_____

Division:_____

Interviewee:_____

Position:_____

Grade:_____ Rank:_____

Gender: M or F Title: Military or Civilian

GENERAL QUESTIONS

1. What does the term benchmarking mean to you?
2. Who were the key players in the department's benchmarking study? What were their responsibilities?
3. How involved were other members of the department? Enlisted personnel? Civilians?
4. Who led the study? Why was this person selected?
5. Who else was involved in the study? Was there a cross representation of people in the study group? Was this team formally appointed to do the benchmarking study?

PLANNING THE STUDY

1. Why did the department decide to do a benchmarking study?
   A. Fear of Base Closure
   B. Visionary Leadership
   C. Competition
   D. Downsizing
2. What organizations were studied? How were they selected?
3. Was a plan of action established before the study?
4. Was an external consultant utilized? Who? what were their responsibilities?

CONDUCTING THE STUDY

1. How did you conduct the study?
2. What models did you use to guide you through the benchmarking study?
3. How long did it take to perform the study? Should the study have been longer or shorter?
4. What reference materials were used to support you in your study?
5. Who did you consult when you encountered a problem?

LEADERSHIP SUPPORT

1. What kind of support did command leadership provide for the benchmarking study?
2. Were there any champions who were not involved in the study? What did they do to assist?
3. Is benchmarking integrated into the command's strategic planning process?

OTHER ORGANIZATIONAL EXPERTISE

1. Has anyone in the command ever conducted a benchmarking study before?
2. Did you seek the assistance of these people before embarking on your benchmarking study? Why or Why not?
3. Have you seen successful benchmarking studies completed in other departments at this command? What do you think made them successful? How about unsuccessful attempts? What do you think caused them to be unsuccessful?

TQL OFFICE

1. Is benchmarking discussed in current Total Quality Leadership training courses? (Obtain training records and review training materials)
2. What support did you receive from the TQL Office?

EDUCATION AND TRAINING

1. What training did the team receive? Was it on-site? Was it off-site.

LESSONS LEARNED

1. Based on your experience with this study, what factors must exist before a benchmarking study is considered a success?
2. What advice would you provide to a department interested in doing a benchmarking study?
3. What were the benefits of conducting the benchmarking study?

A. Would you follow the same procedures as before? Why or why not?

B. What were the strengths of the study?

C. What were the weaknesses or shortcomings of the study?

FOLLOW-UP

1. Were all of the results of the benchmarking study adopted by management and top leadership? Why or why not?
2. Would you perform another study? Why or why not?
3. How long did it take to implement the results of the benchmarking study?
4. Is the department planning to do future benchmarking studies?

REWARDS/INCENTIVES

1. What benefits did the employees gain from the benchmarking study?
2. What awards or recognition were received by the benchmarking team?
3. How does this compare with other awards given at this command?

PUBLIC RELATIONS

1. Are the success stories publicized?

2. Are benchmarking success stories discussed in the department?

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